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The impact of hearing loss and sensory intervention on the risk of progression to dementia in mild cognitive impairment cases

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Background

The high prevalence of dementia and hearing impairment in older adults means these two conditions are likely to coexist. In fact, several studies showed that hearing deficits are linked to accelerated cognitive decline and higher risk of developing dementia, possibly through the impact of hearing loss on the cognitive processing load, changes in brain structure/function, or increased social isolation. Still, relatively little research has been conducted to further explore this relationship, and more importantly, to investigate the role of hearing rehabilitative interventions on cognitive function. In our longitudinal study, we examined the effect of hearing loss on cognitive decline of individuals with mild cognitive impairment (MCI). In addition, we determined the impact of sensory intervention (hearing aids) on the decline in cognitive abilities.

Methods

The longitudinal National Alzheimer's Coordinating Center (NACC) dataset was used to examine the association between hearing loss and MCI-to-dementia conversion. To determine the exact duration of the MCI period, only patients that enrolled as cognitively healthy at baseline and converted to dementia were used. Cognition was assessed using the Clinical Dementia Rating Sum of Boxes (CDRSB) score. The annual rate of change in CDRSB was compared for: 1) hearing loss absent (HN) vs hearing loss present, hearing aid not used (HL-NA); and 2) HL-NA vs hearing loss present, hearing aid used (HL-A) using the Wilcoxon rank sum test with continuity correction. The Cox proportional hazards model was developed to study time to incident dementia.

Results

A reduced risk of progressing to dementia was observed for HN vs HL-NA with hazard ratio (HR), 95% confidence intervals (95%CI) of 0.51, 95%CI(0.26;1.01) ($p_{\log\text{-rank}} = 0.05$). A lower risk of MCI-to-dementia progression was observed for HL-NA vs HL-A (HR = 0.28, 95%CI(0.11;0.74) ($p_{\log\text{-rank}} = 0.006$). Furthermore, the annual rate of change in CDRSB was significantly higher for HL-NA compared to HL-A ($p = 0.027$).

Conclusion

The significant impact of HL and use of hearing aids on the MCI-to-dementia progression was demonstrated. Future work should focus on investigating the effect of HL on the cognition of healthy individuals as well as on developing audiology assessments for adults with cognitive impairment.